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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/916,381	07/27/2001	Sadao Haga	71360-56296	7830
21874	7590	09/08/2005	EXAMINER	
EDWARDS & ANGELL, LLP P.O. BOX 55874 BOSTON, MA 02205			UMEZ ERONINI, LYNETTE T	
			ART UNIT	PAPER NUMBER
			1765	
DATE MAILED: 09/08/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/916,381

Applicant(s)

HAGA ET AL.

Examiner

Lynette T. Umez-Eronini

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 13 June 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 July 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☒ Interview Summary (PTO-413)  
Paper No(s)/Mail Date 3/10/2005
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Request for Continued Examination***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114 because the new prior art teaches an etchant solution containing HF, HNO<sub>3</sub>, and hexafluorosilicic (H<sub>2</sub>SiF<sub>6</sub>) acid wherein the concentration of H<sub>2</sub>SiF<sub>6</sub> is 10 to 40% by weight based on the weight of the etching solution. Applicant's submission filed on 6/13/2005 has been entered.

### ***Declaration under 37 CFR 1.132***

2. The Declaration under 37 CFR 1.132 filed 6/13/2005 is insufficient to overcome the rejection of claims 1-6 based upon the 103(a) rejection over Lee et al. (US 6,284,712) in view of Uchida (US 5,307,296) as set forth in the last Office action because: the results shown in Tables 1 and 2 (on page 2-3 of the Declaration) failed to adequately compare applicants' solutions containing concentrations of hexafluorosilicic acid below 40% (as shown in Examples 1-13 of the present Specification) to an etchant comprising HF, HNO<sub>3</sub>, and H<sub>2</sub>SiF<sub>6</sub> wherein only one concentration of 42.7 % by weight H<sub>2</sub>SiF<sub>6</sub> that lies outside the range of 10% – 40% by weight H<sub>2</sub>SiF<sub>6</sub> was only used to generalize etching solutions containing concentrations of hexafluorosilicic acid greater

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than and outside the 40% are not optimally suited to etching silicon wafers. Applicants further failed to show what is expected if one uses for example, 45%, 50%, 60% . . . etc. by weight  $\text{H}_2\text{SiF}_6$ ?

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-7 are rejected under 35 U.S.C. 102(b) as being anticipated by Satoro et al. (JP 11194120).

Satoro teaches, “. . . a mixed acid solution in an etching process, nitric acid . . . one kind of hydrofluoric acid . . . and hexafluorosilicic acid are contained (Abstract) and etching a silicon wafer [0015 – 0018]. Satoro also teaches, “the concentration of the nitric acid in the mixed-acid liquid . . . fluoric acid (same as applicants’ hydrofluoric acid), an acetic acid, and hexa FURORO silicic acid (same as Applicants’ hexafluorosilicic acid), [0048]. Satoro further teaches “. . . hexa FURORO silicic acid mixing concentration and the concentration of fluoric acid, and the concentration of an acetic acid corresponded to 39.3% of the weight, 7.5 % of the weight, and 20.9% of the weight, respectively” [0046]. The aforementioned reads on,

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"An etching solution containing at least hydrofluoric acid, nitric acid and hexafluorosilicic acid, the concentration of the hexafluorosilicic acid being 10% to 40% by weight based on the weight of the etching solution, **in claim 1**;

wherein the concentration of the hexafluorosilicic acid is 15 to 40% by weight based on the weight of the etching solution, **in claim 2**;

which is used for etching a silicon substrate, **in claim 7**; and which falls within the range,

wherein the concentration of the hydrofluoric acid is 1 to 20% by weight based on the weight of the etching solution, **in claim 3**;

wherein the concentration of the nitric acid is 20 to 60% by weight based on the weight of the etching solution, **in claim 4**;

further comprising acetic acid, **in claim 5**;

wherein the concentration of the acetic acid is 0.01 to 5% by weight based on the weight of the etching solution, **in claim 6**.

### ***Response to Arguments***

5. Applicant's arguments with respect to claims 1-7 have been considered but are moot in view of the new ground(s) of rejection because the newly found art teaches an etchant containing at least hydrofluoric, nitric and hexafluorosilicic acids, and the concentration of the hexafluorosilicic acid being 10% to 40% by weight based on the weight of the etching solution.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynette T. Umez-Eronini whose telephone number is 571-272-1470. The examiner is normally unavailable on the First Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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August 30, 2005

**NADINE G. NORTON**  
**SUPERVISORY PATENT EXAMINER**

